

FUNDING REQUEST FOR BNL NEUTRINO FACTORY STUDIES

On p29, the APS Study of Neutrino Physics report (**The Neutrino Matrix**) it states that *A high-intensity neutrino factory or a Beta Beam facility is the ultimate tool in neutrino physics for the long term, and may be the only facility capable of definitively addressing some of the physics issues. For instance, only a Neutrino Factory would have the capability to observe θ_{13} , and study possible CP violation when the value of $\sin^2(2\theta_{13})$ is in the range between 10^{-4} to 10^{-2} .* The report states further that *The neutrino factory R&D program needs increased levels of support if the facility is to be realized in the long term.*

The Physics Department Advanced Accelerator Group is working on such R&D as part of the National Muon Collaboration (MC) with spokespersons S. Geer and R.B. Palmer, and Project manager M. Zisman. Currently, DOE M&S funding is administered by the project Manager, while a base of salaries and other expenses are administered by the individual institutions. The Muon Collaboration Oversight Group (MCOG) oversees this effort and, together with the collaboration spokespeople, is coordinating requests for additional support. This proposal is for additional funding for the base effort at BNL. Separate proposals are being prepared by FNAL and LBNL for support of their base effort, and by the project Manager for additional M&S funding. Currently, the BNL Advanced Accelerator Group's main efforts are: Studies of high power target, non-scaling FFAGs and machine studies.

The first effort is:

- Studies of high power targets, addressing both solid and liquid target materials. There is a world-wide effort to design and implement proton driver beams in the multi-MW class which can provide the basis for producing powerful, intense secondary beams. In particular, the BNL targetry program within the Muon Collaboration has developed a scenario for the production of intense muon beams based on immersing a high-Z liquid material (either Hg or Pb-Bi eutectic) within a high-field solenoid for the purpose of producing and capturing the soft pions generated when the proton beam interacts with the target. This effort includes a leadership role in the approved CERN experiment (nTOF11) to demonstrate the technical feasibility of a Hg jet target under conditions suitable for a Neutrino Factory. Since such work has such diverse applications, **the proposal for additional funding is addressed in a separate section.**